

TITLE OF THE INVENTION

A DIGITAL BROADCASTING RECEIVER FOR RECEIVING ANALOG BROADCASTING AND A METHOD THEREOF

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This application claims the benefit of Korean Application No. 54345/1997, filed October 23, 1997, in the Korean Patent Office, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

10 The present invention relates to a digital broadcasting receiver for receiving analog broadcasting and a method thereof, and more particularly, relates to a digital broadcasting receiver for receiving analog broadcasting and a method thereof by selectively receiving analog broadcasting or digital broadcasting, according to a selection of a user in a digital satellite broadcasting receiver or a digital cable broadcasting receiver using a digital transmission system such as a high definition television.

2. Description of the Related Art

15 Nowadays, ^{data (information)} ~~a data (information)~~ transmission system is being changed from an analog type to a digital type due to technical improvements of information media.

20 ^{In order} ~~Then~~ to meet the requirement for transmitting an utmost amount of information within the same time, the data is compressed and transmitted using a data compressing rule,

such as an MPEG (Moving Pictures Expert Group). ^{International Standard Organization (ISO)}

25 The ^{coding (compressing)} ~~ISO~~ standardizes the MPEG as a standardized coding system, related to a digital motion picture ~~coding (compressing)~~ system, an acoustic coding system and a multiplexing and separating system, for communication, broadcasting, media for storing data, and computer fields.

30 The MPEG compresses an audio visual such as an acoustic signal, a motion picture, and a still image at a high rate and transmits the same. The advantages of using the MPEG

a For example, it are provided hereinafter. ^{it} is possible to obtain a multi-channeling and high-definition transmission effect in the broadcasting. An occupied amount of the media for storing data can be reduced. Multimedia information can be stored in a low-priced storing medium. And, multimedia communication is cheaply executed in the multimedia communication field.

5 Accordingly, MPEG has become a core technology in the recent multimedia era.

a In the mean time, generally, a television receiver is standardized for processing an analog broadcasting signal. For receiving a digital broadcasting signal in ^{an} ~~the~~ analog-type television receiver, according to spreading a satellite broadcasting system and other digital broadcasting systems, a digital broadcasting receiver, that is an additional converting apparatus, ^{called} a 'Digital Set Top Box', for converting the compressed and transmitted digital broadcasting signal, according to the MPEG rule, in the analog broadcasting signal is required.

a 10 The digital broadcasting receiver converts the digital-type video signal from a program supplier or a service supplier, that is, each broadcasting station such as a satellite broadcasting station and a cable broadcasting station such as a cable television broadcasting station, into the analog-type video signal. That is, the digital broadcasting receiver can convert the digital broadcasting system into the broadcasting system for processing the signal in the general television receiver. Recently, the digital broadcasting receivers are widely utilized according to the desire of the user to view the digital-type broadcasting signal.

15 20 Accordingly, as is well known, after converting programs from the analog signal into the digital signal, each broadcasting station or cable broadcasting station supplies the programs. For transmitting a large amount of information, the converted data is compressed by a predetermined compression rule and transmitted to a viewer via a communication network.

25 The digital broadcasting receiver (digital set top box) receives the transmitted digital data and displays the analog signal on a monitor after converting the digital data into the analog signal at the viewer's side.

30 As mentioned above, FIG. 1 is an apparatus for processing the digital signal, which is compressed and transmitted by each broadcasting station or cable broadcasting station, to the analog signal and displaying the analog signal.

The apparatus shown in FIG. 1 will be described hereinafter as an example of a conventional digital broadcasting receiver.

As shown in FIG. 1, the digital broadcasting receiver includes: a digital broadcasting tuner 101, which tunes a compressed hybrid carrier signal, ^{including both an analog signal and a digital signal} which is transmitted from the broadcasting station or the cable broadcasting station and input via an input terminal 100, to a frequency of a relevant channel and changes an amplitude of the tuned carrier signal in proportion to a size of a phase shift modulation signal; a diplexer 102 for eliminating a mutual interference between the video signal and the audio signal ^{of carrier signal} ~~among the tuned carriers~~ ^{which are tuned by the digital broadcasting tuner 101}; a filter unit 103 for extracting a digital signal band ^{tuned carrier} ~~only~~ by filtering the carrier signal, obtained from the diplexer 102; an analog to digital (A/D) converting unit 104 for converting the ^{from the tuned carrier signal} ~~extracted~~ analog signal into the digital signal and outputting the same; a demodulation unit 105 for restoring ^{of the tuned carrier signal} ~~the~~ digital data, obtained from the A/D converting unit 104, to initial data; an automatic error correcting unit 106 for correcting the error generated from the interference between adjacent channels, which corrects a carrier data format, demodulated and input by the demodulation unit 105, based on residue information, and outputs the same by a packet unit; an MPEG process unit 107 which MPEG processes the video data and the audio data, which are input after the error is corrected, stores the same in a memory unit ¹⁰⁹ ~~108~~, and additionally, converts the same to an initial composite video signal CPSV and an audio signal ADS and respectively outputs the composite video signal CPSV and the audio signal ADS to a video output terminal 111 and an audio output terminal 112; and a high frequency modulation unit 108, for modulating the digital composite video signal CPSV and the audio signal ADS, which are restored by the MPEG process unit 107, to the high frequency signal and supplies the high frequency signal to a television receiver via an output terminal 110.

In the conventional digital broadcasting receiver having the above-mentioned structure, when the compressively hybridized digital video signal and the audio signal, which are related to the program from the broadcasting station or the cable broadcasting station, are input as a carrier signal via the input terminal 100, the digital broadcasting tuner 101 tunes the input and compressed hybrid carrier signal via the input terminal 100 to the frequency of

a the^a relevant channel and changes the amplitude of the tuned carrier signal in proportion to the size of the phase shift modulation signal.

The diplexer 102 receives the amplitude-changed carrier signal via the digital broadcasting tuner 101. The diplexer 102 eliminates the mutual interference between the video signal and the audio signal, among the tuned carrier signals via the digital broadcasting tuner 101, and supplies the interference-eliminated signals to the filter unit 103.

In the mean time, the filter unit 103 filters out the input carrier signal from the diplexer 102 and detects only a digital signal band, that is^a the^a band from 450 MHz to 700 MHz. The carrier signal having an analog characteristic, detected via the filter unit 103, is converted into^a the digital signal via the analog/digital converting unit 104 and is supplied to the demodulation unit 105. The carrier data, restored by the demodulation unit 105, of which an error, generated by the interference between the adjacent channels, is corrected by the automatic error correcting unit 106, ^{and} is supplied to the MPEG process unit 107 as initial audio and video packet data.

Accordingly, the MPEG process unit 107 stores the video data and the audio data, which are input from the automatic error correcting unit 106, to the memory unit¹⁰⁹ 108, MPEG processes the initial composite video signal CPSV and the audio signal ADS, respectively outputs the composite video signal CPSV and the audio signal ADS via the video output terminal 111 and the audio output terminal 112 and supplies the composite video signal CPSV and the audio signal ADS to the high frequency modulation unit 108.

The high frequency modulation unit 108 modulates the composite video signal CPSV and the audio signal ADS, which are MPEG processed, and supplies the same to the television receiver via the output terminal 110. Accordingly, the viewer can see the digital broadcasting via a color cathode ray tube. The composite video signal and the audio signal, which are respectively output to the video output terminal 111 and the audio output terminal 112, are supplied to a digital video disk player or a digital video cassette recorder and stored in a magnetic recording medium.

a But, as ^{is well known} ~~well is known~~, when the received broadcasting signal and the received cable broadcasting signal are the digital broadcasting signal, the above-mentioned conventional digital broadcasting receiver receives the broadcasting signal and displays the same on the

television receiver. When the received broadcasting signal is an air broadcasting signal or the analog cable broadcasting, the digital broadcasting receiver cannot receive the analog signal directly.

Accordingly, the conventional digital broadcasting receiver cannot receive the analog signal, which is transmitted from the air broadcasting or the cable broadcasting. Consequently, it is a problem to receive the analog broadcasting signal via the digital broadcasting receiver.

Accordingly, a digital broadcasting receiver, which can receive both the analog/digital broadcasting, with respect to the air broadcasting or the analog cable broadcasting and having a higher quality than that of the conventional digital broadcasting receiver, is required.

SUMMARY OF THE INVENTION

Therefore, it is an object of the present invention to provide a method and apparatus for receiving an analog broadcasting using a digital broadcasting receiver selectively receiving analog broadcasting and digital broadcasting and displaying the same on a screen by using the one digital broadcasting receiver.

It is another object of the present invention to provide an additional information screen with respect to the same in receiving the digital broadcasting, in a case that the analog broadcasting is received.

It is still another object of the present invention to prevent jittering, in a case that a user alternately views the digital broadcasting and the analog broadcasting.

It is a further object of the present invention to provide an apparatus which corresponds to a product that requires as outputs a composite video signal, a luminance/color and a high frequency modulation.

Additional objects and advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

According to one aspect of the present invention, the digital broadcasting receiver extracts the digital band from the carrier signal, tuned by the digital broadcasting tuner, passes through the extracted digital band via a quadrature phase shift demodulation unit, a

forward direction error correcting unit and a reverse multiplexing unit, restores video data and audio data by an MPEG audio/video process unit and outputs the same. The digital broadcasting receiver for receiving analog broadcasting includes a controller, which generates more than two control signals having respectively different information, for receiving

to receive analog or digital ~~analog/digital~~ broadcasting, according to the selection of an analog broadcasting channel or an digital broadcasting channel; an air tuner for receiving the analog broadcasting, by the control signal of the controller; a synchronous separation unit for extracting a synchronous signal from the analog broadcasting, received by the air tuner; an additional information process unit for generating additional information by the control signal of the controller; a video encoder unit, which encodes one signal by the control signal generated from the controller to the analog video signal by synchronizing to the synchronous signal, which is obtained by the synchronous separation unit, wherein one signal is a signal between the video signal which is obtained from the MPEG audio/video process unit, and the additional information which is obtained from the additional information process unit; a video mix unit for mixing the video signal from the air tuner and the encoded signal according to the control signal of the controller and transmitting the mixed signal; a digital/analog converting unit for converting the audio signal, which is obtained from the MPEG audio/video process unit, to the analog signal; and an audio selection unit for selecting and transmitting the converted audio signal and the audio signal which is obtained by the air tuner according to the control signal of the controller.

Preferably, the digital broadcasting receiver for receiving the analog broadcasting further includes a luminance/color separation unit for separating the mixed analog video signal which is mixedly obtained by the video mix unit into a luminance signal and a color signal and transmitting the separated analog signal.

Preferably, the video mix unit overlaps the additional information, obtained by the video encoder unit according to the control signal of the controller, with the analog video signal, received by the air tuner, and transmits the overlapped analog video signal.

Selectively, the digital broadcasting receiver for receiving the analog broadcasting may further include a luminance/color separation unit for separating the analog video signal which is received by the air tuner into the luminance signal and the color signal; and a

a to detect and change the separated
a switching unit for switching the control signal to a continuous signal by detecting the
a to a continuous signal, and transmits the continuous signal
unit.

a Moreover, selectively, the video mix unit includes a switcher, wherein the switcher
a 5 maps the additional information ^{other than} ~~except for~~ ^{encoded MPEG processed analog signal} a transparency between the ~~analog video signal~~,
a obtained from the video encoder unit, and the analog video signal, received ^{from} by the air tuner,
a ~~according to the control signal of the controller~~, and outputs the mapped additional
information.

a According to another aspect of the present invention, a method ^{of} for receiving an
a 10 ~~signal and a digital broadcasting signal~~ analog broadcasting using a digital broadcasting receiver comprises the steps of selecting ^{one of} a
a digital broadcasting channel and an analog broadcasting channel using a digital broadcasting
tuner and an air tuner; tuning the air tuner, receiving the analog broadcasting ^{signal} of the
corresponding analog broadcasting channel and extracting the synchronous signal from the
received analog broadcasting signal, in the case that the selected broadcasting channel is the
analog broadcasting channel; tuning the digital broadcasting tuner, receiving the digital
broadcasting ^{signal} of the corresponding digital broadcasting channel via the digital broadcasting
a ~~the digital broadcasting signal into an~~ MPEG tuner and separating a video signal and an audio signal ^{MPEG processed using} by MPEG processing, in the case that
a ~~MPEG processed~~ the selected broadcasting channel is the digital broadcasting channel; selectively encoding the
a MPEG processed video signal and the predetermined additional information, according to the
a 20 ~~selected~~ ^{selectively} ~~additional information overlapped within the~~ ^{selected synchronous signal}; selecting, overlapping and transmitting the video signal and the
a ~~additional information, which are encoded, and the video signal of the received analog~~ ^{separated from the analog broadcasting signal}
ins a 3 ~~broadcasting, if necessary; and selecting the MPEG processed audio signal and the audio~~ ^{selectively transmitting} ~~signal of the received analog broadcasting, if necessary, and transmitting the selected signal.~~ ^{separated from the digital broadcast signal and the analog broadcasting signal}

a Preferably, when the selected channel is the digital broadcasting channel in the ^{signal}
a 25 ~~selective encoding~~ ^{encoding step}, the additional information is overlapped with the MPEG processed video data
and encoded. In the mean time, when the selected channel is the analog broadcasting
channel, the additional information is encoded.

a Also, preferably, when the selected channel is the digital broadcasting channel ^{in the selective}
a ~~MPEG processed video signal~~ ^{transmitting step}, the ~~video data~~ and the additional information, which are overlapped, are

selected and transmitted. In the mean time, when the selected channel is the analog broadcasting channel, the additional information is overlapped with the video signal of the analog broadcasting and transmitted. ^{analog broadcast} ^{separated from}

Moreover, preferably, when the selected channel is the analog broadcasting channel in the transmitting step, the information except for the transparency is mapped onto the video signal and transmitted. ^{of the additional information which does not include a} ^{analog broadcast}

In this manner, by receiving the analog broadcasting and the digital broadcasting via one digital broadcasting receiver, the user can see one broadcasting on the screen of the television receiver, selectively, and the additional information received in the analog broadcasting, that is the same as in receiving the digital broadcasting. ^{signal} ^{signal} ^{of the analog and digital broadcasting signals} ^{with} ^{signal}

Consequently, by receiving the analog broadcasting and the digital broadcasting via one broadcasting receiver, the present invention provides convenience in use and compatibility with the television receiver. ^{signal} ^{signal}

It is possible for the present invention to have a plurality of preferred embodiments and the most preferred embodiment of the present invention will be described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete appreciation of the present invention, and may of the attendant advantages thereof, will become readily apparent as the same becomes better understood by reference to the following detailed description when considered in conjunction with the accompanying drawings in which like reference symbols indicate the same or similar components, wherein:

FIG. 1 is a block diagram of a conventional digital broadcasting receiver; and

FIG. 2 is a block diagram of a digital broadcasting receiver for receiving an analog broadcasting, according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Reference will now made in detail to the present preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein

like reference numerals refer to the like elements throughout. The embodiments are described below in order to explain the present invention by referring to the figures.

The preferred embodiment of a digital broadcasting receiver for receiving an analog broadcasting will be more clearly understood through the attached drawings.

In the following description, when the detailed description related to disclosed function and structure is unnecessarily obvious to the substance of the present invention, the detailed description will be emitted.

Moreover, the present invention can be applicable to various apparatuses for receiving the digital broadcasting, such as a high definition television receiver, a high definition video cassette recorder having a tuner, etc.

Accordingly, FIG. 2 is a block diagram of a digital broadcasting receiver for receiving both the analog broadcasting and the digital broadcasting and displaying the same on a screen, not a digital broadcasting receiver for receiving the digital broadcasting only. *As a result, the screen is only receipt of the analog broadcasting by*

Moreover, in the following description, *Receiver* the apparatus for receiving the digital broadcasting in the general receiver for receiving the analog television receiver will be considered.

According to the preferred embodiment, a digital broadcasting receiver for receiving digital/analog broadcasting includes a controller ²¹⁹ which determines whether an analog or digital broadcasting channel is selected, *by* according to a remote controller (not shown) or a set-mounted channel key, and generates corresponding first through an eighth control signals (CS1 through CS8); a tuning unit 200 ~~which respectively~~ receives the digital broadcasting channel via a digital broadcasting tuner 200a, according to the second control signal CS2, and receives the analog broadcasting channel via the air tuner 200b, according to the second control signal CS2; and an analog/digital converting unit 201 ~~which converts the modulated and received carrier signal into a digital signal, wherein the carrier signal is modulated in a quadrature phase shift keying manner via the digital broadcasting tuner.~~ *200a*

The digital broadcasting receiver further comprises a quadrature phase shift demodulation unit 202 which restores the converted and input digital broadcasting signal to initial data according to the first control signal CS1 of the controller; ²¹⁹ a forward direction error correcting unit 203, which corrects a carrier data format based on residue information,

wherein the carrier data is demodulated and input from the quadrature phase shift demodulation unit 202 according to the first control signal CS1 which is generated by the controller, ²¹⁹ in order to correct a bit error, generated from an interference between adjacent channels and outputs the same ^{as} by a packet unit; a reverse multiplexing unit 204 which reverse multiplexes the error-corrected and input carrier data format to video data and audio data, according to the third control signal CS3; an MPEG audio/video process unit 206 which respectively MPEG processes the video data and the audio data, which are reverse multiplexed and input, according to the fourth control signal CS4 of the controller, ²¹⁹ and ^{determines} ~~determines~~ whether to output the video data and audio data, which are respectively MPEG processed; and an additional information process unit 205 which determines whether to generate ~~the~~ additional information, according to the fourth signal CS4 of the controller. ²¹⁹

The digital broadcasting receiver ^{also} ~~still further~~ includes a synchronous separation unit 207 which separates the synchronous signal from the analog broadcasting signal of the corresponding analog broadcasting channel, which channel is tuned by the air tuner 200b of the tuning unit 200, and outputs the same; a video encoder unit 208 which encodes the video data, output by the MPEG audio/video process unit 206, and the additional information, input from the additional information process unit 205, according to a fifth control signal CS5 of the controller and the synchronous signal, separated by and input from the synchronous separation unit 207, and ^{transmits} ~~transmitted~~ the same via an image output terminal 218; a video mix unit 209 which overlaps the additional information, encoded and input by the sixth control signal CS6, with the analog video signal, tuned and input from the air tuner 200b, and outputs a composite image signal via an image output terminal 216 when the analog broadcasting channel is ^{selected} ~~selected~~ and which selects the video signal and the additional information, ~~with respect to the~~ encoded and input according to the sixth control signal CS6, and transmits to the television receiver via the image output terminal 216 when the digital broadcasting channel is selected; a digital/analog converting unit 210 which converts the audio signal, input from the MPEG audio/video process unit 206, to the analog signal and ^{outputs} ~~outputting~~ the same; an audio selection unit 211 which selects the converted analog audio signal and the audio signal, tuned and input by the air tuner 200b, according to the seventh control signal CS7, and ^{transmits} ~~transmitting~~ the same to the television receiver.

a Moreover, if the outputting of a luminance/color (Y/C)^{signal} in addition to the outputting of the composite image signal is necessary, the basic digital/analog broadcasting receiver further includes: a second luminance/color separation unit 215 which separates the composite image signal, with respect to the digital broadcasting and the analog broadcasting, input from the video mix unit 209, into a luminance Y signal and a color C signal, and ^{transmits} ~~transmitting~~ the same; a first luminance/color separation unit 212 which separates the analog composite image signal which is tuned and input by the air tuner 200b into the luminance Y signal and the color C signal; and first and second switching units 213 and 214 which change the separated and input luminance Y signal and the color C signal to a continuous signal, according to the eighth control signal CS8, and transmitting the same.

a The digital broadcasting receiver for receiving the analog broadcasting in the above-mentioned manner selectively receives ^{signal} ~~the analog broadcasting~~ and the digital broadcasting via an air ^{antenna, cable} ~~antenna~~ or a parabolic antenna in accordance with the above-mentioned operation.

a First, when the user turns on the digital broadcasting receiver and the television receiver, the controller²¹⁹ of the digital broadcasting receiver generates the fourth control signal CS4, controls the additional information process unit 205 and generates graphic data with respect to the additional information.

a The graphic data, generated from the additional information process unit 205, is transmitted^{as} to the ^{luminance/color (Y/C)} ~~luminance/color (Y/C)~~ signal via the video encoder unit 208 and the image output terminal 218 and simultaneously, transmitted to the television receiver via the video mix unit 209 and the image output terminal 216, which will be described later, and displayed on a display screen.

a Thus, when the user selects the digital broadcasting channel^{from} in the graphic data of the display screen using ^a ~~the~~ remote controller²¹⁹ or a key on the television set, the controller generates ~~the first through the seventh~~ control signals CS1 through ^{CS3 and CS5 through} CS7.

a The second control signal CS2, generated from the controller²¹⁹, controls the digital broadcasting tuner 200a of the tuning unit 200^{which} and receives the digital broadcasting signal of the corresponding digital broadcasting channel via the parabolic antenna.

a The analog broadcasting signal of the carrier signal

The carrier signal, which is quadrature phase shift key modulated and received via the digital broadcasting tuner 200a, is digitalized via the analog/digital converting unit 201 and input to the quadrature phase shift demodulation unit 202.

a 5 The quadrature phase shift demodulation unit 202 demodulates the converted and input digital broadcasting signal to the initial data ^{according to} by the first control signal CS1, generated from the controller. ²¹⁹ (initial data)

a The carrier data, restored by the quadrature phase shift demodulation unit 202, is input into the reverse multiplexing unit 204 ^{after} when the forward direction error correcting unit 203 corrects the error which is generated by the interference between the adjacent channels according to the first control signal CS1 of the controller. ²¹⁹

a 10 The reverse multiplexing unit 204 reverse multiplexes the multiplexed and input carrier data to the video data and the audio data according to the third control signal CS3, generated by the controller, ²¹⁹ and supplies the same to the MPEG audio/video process unit 206.

a 15 The MPEG audio/video process unit 206 respectively MPEG processes the video data and the audio data, which are reverse multiplexed and input, according to the fourth control signal CS4 of the controller, ²¹⁹ and respectively supplies the MPEG audio data to the digital/analog converting unit 210 and the MPEG video data to the video encoder unit 208.

a 20 Then, the additional information process unit 205 supplies the additional information to the video encoder unit 208 according to the fourth control signal CS4 of the controller. ²¹⁹

Accordingly, the video encoder unit 208 analogizes the MPEG video data and the additional information, which are input from the MPEG audio/video process unit 206, according to the fifth control signal CS5, transmits the same via the image output terminal 218 and simultaneously, supplies the same to the video mix unit 209.

25 The video mix unit 209 mixes the analogized composite image signal and the additional information, which are encoded and input by the sixth control signal CS6 of the controller, ²¹⁹ and supplies the same to the television receiver via the image output terminal 216. Moreover, the digital/analog converting unit 210 analogizes the MPEG audio data, which is input by the MPEG audio/video process unit 206, and supplies the same to the audio selection unit 211.

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a The audio selection unit 211 selects the audio signal with respect to the analogized and input digital broadcasting according to the seventh control signal CS7 of the controller²¹⁹ and supplies the same to the television receiver via the audio output terminal 217. Accordingly, the user can view the digital broadcasting which displays the additional information via the color cathode ray tube.

a In the mean time, ^{in the} as above-mentioned manner, in receiving the analog broadcasting via the digital broadcasting receiver for receiving the digital broadcasting, when the analog broadcasting channel number in the image graphic data of the television receiver is selected by using the remote controller or the key on the television receiver set, the second or the fourth through the seventh ^{control signals} controls CS2, CS4, CS5, CS6 and CS7, which have ^a different information value with respect to the receiving of the digital broadcasting, are generated.

a Then, the second control signal CS2, generated from the controller²¹⁹, controls the air tuner 200b of the tuning unit 200 and selects the corresponding analog broadcasting channel.

The analog broadcasting signal of the selected channel, that is the output composite image signal from the air tuner 200b, is separated into the synchronous signal by the synchronous separation unit 207 and input into the video encoder unit 208, and also separated into the video signal and the audio signal. The separated video signal is input into the video mix unit 209 and the separated audio signal is input into the audio selection unit 211, respectively.

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25 In changing from the digital broadcasting to the analog broadcasting, by adjusting the phase between the synchronous signal, separated in the synchronous separation unit 207 and the synchronous signal according to the MPEG screen, that is the synchronous signal according to the video data screen of the channel in receiving the digital broadcasting, the jittering of the screen during changing the broadcasting is prevented. In other words, the synchronous signal from the composite image signal in the synchronous separation unit 207 is separated and the phase is adjusted to the digital broadcasting.

a In changing from the digital broadcasting to the analog broadcasting, the MPEG audio data and the MPEG video data, ^{prior to being processed} ~~which are before processing~~ by the MPEG audio/video process unit 206, are intercepted ^{using} by the fourth control signal CS 4 of the controller²¹⁹ and only

the additional information from the additional information process unit 205 is continuously supplied to the video encoder unit 208.

Accordingly, according to the fifth control signal CS5, the video encoder unit 208 analogizes the graphic data with respect to the additional information to the luminance Y signal and the color C signal, transmits the same via the image output terminal 218 and simultaneously, supplies the same to the video mix unit 209.

Then, the video mix unit 209 overlaps the luminance/color(Y/C) signal, with respect to the encoded and input additional information from the video encoder unit 208, with the analog video signal which is tuned by the air tuner 200b, according to the sixth control signal CS6 of the controller, and outputs the composite image signal to the television receiver via the image output terminal 216.

Selectively, it is possible to map the information except for the transparency and so on, by using the video switching unit instead of using the video mix unit 209, onto the analog video signal and to supply the same to the television receiver.

Consequently, according to the seventh control signal CS7 of the controller, the audio selection unit 211 selects the analog audio signal which is tuned by the air tuner, and transmits the same to the television receiver via the audio output terminal 217. Accordingly, the MPEG screen, which has been receiving the digital broadcasting, is changed to the analog broadcasting screen. However, the additional information, such as on screen display information, is maintained without change.

In changing from receiving the analog broadcasting to receiving the digital broadcasting again, as mentioned in the foregoing, the analog broadcasting screen is changed to the MPEG screen of the digital broadcasting after synchronizing both phases.

And, selectively, to output the luminance Y signal and the color C signal in addition to the composite image signal, the first and the second luminance/color separation units 212 and 215 and the first and the second switching units 213 and 214 are additionally required, as shown in FIG. 2. And, the eighth control signal CS8 from the controller is also required.

In other words, the second luminance/color separation unit 215 separates the luminance Y signal and the color C signal from the composite image signal with respect to the digital broadcasting or the analog broadcasting, which is mixed with the additional

information and input by the video mix unit 209, and supplies the same to the television receiver.

a 5 The first luminance/color separation unit 212 separates the composite image signal with respect to the pure analog signal, which is input from the air tuner 200b, into the luminance signal and the color signal, and ^{supplies} supply the same to the first and the second switching units 213 and 214.

a 10 The first and the second switching units 213 and 214 change the luminance signal and the color signal, which are separated and input by the first luminance/color separation unit 212, to the continuous signal by the eighth control signal CS8 of the controller ²¹⁹ and supply the same to the video cassette recorder or the television receiver.

a 15 In the mean time, in comparison with the prior art, ^{in which} the user can view the screen by MPEG processing the video signal and the audio signal of the digital broadcasting via the MPEG process unit of the digital broadcasting receiver, when the present invention uses the air tuner, video mix unit and the ^{first and second switching units} video switching unit for receiving the analog broadcasting, the present invention can receive the analog broadcasting of which is transmitted by the air broadcasting or the cable broadcasting, ~~and~~ in addition to the digital broadcasting.

a 20 Consequently, according to the present invention, by receiving the analog broadcasting and the digital broadcasting using one broadcasting receiver, the digital broadcasting receiver can receive the analog broadcasting and the digital broadcasting according to the selection of the video mix unit or the video selection unit. And by displaying the same additional information with respect to receiving the digital broadcasting which receives the analog broadcasting, the present invention provides convenience in usage and compatibility with the television receiver.

25 It is clearly understood through the detailed descriptions that the apparatus for receiving the analog broadcasting of the digital broadcasting receiver can receive the air broadcasting or the analog cable broadcasting by using one digital broadcasting receiver. Also, the digital broadcasting receiver for receiving the analog broadcasting can provide the convenience in usage and the compatibility with the television receiver by adapting the basic analog tuning function without increasing the cost.

As the terms mentioned in the specification are determined based upon the function of the present invention, and they can be changed according to an artisan's intention or usual practice, the terms should be determined considering the overall contents of the specification of the present invention.

5 While there have been illustrated and described what are considered to be preferred embodiments of the present invention, it will be understood by those skilled in the art that various changes and modifications may be made, and equivalents may be substituted for elements thereof without departing from the true scope of the present invention. In addition, many modifications may be made to adapt a particular situation to the teaching of the present
10 invention without departing from the central scope thereof. Therefore, it is intended that the present invention not be limited to the particular embodiment disclosed as the best mode contemplated for carrying out the present invention, but that the present invention includes all embodiments falling within the scope of the appended claims.